

Arizona Potato Collecting Trip Report, 2002

TRIP LOG

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Friday, Sept 20th

Bamberg and Fernandez drive to Green Bay airport 4 AM for 6 AM flight to Phoenix arriving about noon. Rent SUV Ford Expedition and drive E to Superior for lunch, to near Globe, N on 88 to 288 toward Young to site of Johnson J-28 (1938) = Bamberg's database 303F.

BF 92. fendleri. Arizona. Gila County. Tonto National Forest, Sierra Ancha Wilderness. Near Young. S of Young on 288 between mile 278 and 279 take hiking trail 160 up Parker Creek. Near site of Johnson J-28 (1938), Bamberg's database collection 303F. Only in N facing rock pocket directly below dam/water gauge on S side. Green and robust to 8 inches. About 100-200 plants. No flowers, mature and immature fruit. Collected about 25 fruit. $33^{\circ} 47.806' \times 110^{\circ} 57.558'$. 5428 ft. Are coordinates of Johnson J-28 in error? This is about 2/3 mile up the *South* fork of Parker Creek.

N on 288 about 5½ miles to Workman Creek road, FR 487.

BF 93. fendleri. Arizona. Gila County. Tonto National Forest, Sierra Ancha Wilderness. Near Young. S of Young on 288 on FR 487 = Workman Creek road. Near site of Gould 3735 (1946), Bamberg's database 216F. About 2 miles from 288, about 60 paces SE of picnic site along W roadside. Robust, green plants, about 50 in number to 10" tall with clusters of many mature fruit. Collected fruit. $33^{\circ} 49.766' \times 110^{\circ} 56.739'$. 6000 ft.

Continue on FR 487, Workman Creek road to Aztec Peak. No previous reports here. Looked appropriate, but found nothing.

Stay at Young in only available lodging, Pleasant Valley motel.

Saturday, September 21st

S from Young on 288 about 2 miles to Refuse Transfer Station site. Pinyon/Juniper scrub and around drainage from Station. Looked appropriate, but found nothing. Back to Young for breakfast at Antlers (one

of two eating options) and gas at Buddi's (only gas in Young). Return down 288 to Reynold's Creek Road = jeep trail FR 410, about 4 miles SE to 150 trailhead.

BF 94. *fendleri*. Arizona. Gila County. Tonto National Forest, Sierra Ancha Wilderness. Near Young. S of Young on 288, SE 4 miles on Reynold's Creek Road = jeep trail FR 410, and 50 paces down hiking trail 150. Where trail crosses creek with large black boulders (unshaded) among grasses. About 30 large (but grazed) green plants, no flowers, mature fruit. Collected fruit. GPS reading of $33^{\circ} 50.793' \times 110^{\circ} 55.492'$ does not seem to fit map. 6280 ft.

BF 95. *fendleri*. Gila County. Tonto National Forest, Sierra Ancha Wilderness. Near Young. S of Young on 288, SE 4 miles on Reynold's Creek Road = jeep trail FR 410, and down hiking trail 150 about $1\frac{1}{4}$ miles. Just before sign that says "one mile to Knowles Spring Hole" where trail meets creek for about 200 yds. Near site of Imdorf and Rebman 970 (1992) = Bamberg's database 296F. $33^{\circ} 50.544' \times 110^{\circ} 54.779'$ 6620 ft. In leaf mulch under Ponderosas and brush. Many thousands of plants, green to 12" or maturing, with no flowers but mature fruit. Collected fruit.

Back to Young for lunch at "Antlers" and N on 288 to 260. W to Woods Canyon Lake. Sites of Hesselberg s.n. (1966) = Bamberg's database 265J and Mason and Mason 2291 (1963) = Bamberg's database 349F. Looked extensively below dam and under Ponderosas. Looked moist and appropriate, but found nothing. This site was also searched unsuccessfully in 1999. Take 260 NE to near Heber. Check Bam 5 (1996) *jamesii* site. A few scattered plants, with larger (6") ones senescing. No sample. NW on FR 504 for 5 miles to FR 228, then jeep trail 997B.

BF 96. *jamesii*. Arizona. Navajo County. Apache-Sitgreaves National Forest. Near Heber. NW on FR 504 for 5 miles to FR 228, then jeep trail 997B. About one mile. Fairly abundant in moist sand under Pinyons. No flowers or fruit, too mature for transplants. Collected tubers (set particularly far from plant). Near sites Tharalson 17 (1990) and Tharalson s.n. (1990) = Bamberg's database 476J and 477J, respectively. GPS says $34^{\circ} 29.532' \times 110^{\circ} 39.753'$. 6723 ft.

E on 260 to Show Low to Lodge at KC Motel.

Sunday, September 22nd

N on 77 from Show Low to Snowflake and W on 277 for 12 miles to site of Lehto 3469 (1963) = Bamberg's database 317J. Dry Juniper - Pinyon scrub. "High mesa" of Lehto incongruous. Found nothing. Back to Snowflake for breakfast at Katie's. Then 77 S to city of Taylor, site of Hough 84 (1897) = Bamberg's database 278J. Searched likely spots near creek (Bellybutton road) and under trees, but found nothing here. Much could have changed in the 105 years since this herbarium specimen collection. To Show Low and 73 to PineTop-Lakeside. N on Porter Mountain Road to Porter Creek.

BF 97. jamesii. Arizona. Navajo County. Sitgreaves National Forest. Near Lakeside Ranger Station. N of 73 on Porter Mountain Road ca. 1 mile to Porter Creek then by foot ca. ½ mile W to intersection with Show Low creek. Site of Pultz 1799 (1945) = Bamberg's database 405J. SE facing cliff of volcanic boulders along shallow winding stream. Among boulders with shrubs and grass in moist, black organic soil. Scattered patches of green and robust plants to 24 inches but often elongated from stretching out of shaded rock crevices. Collected smaller green transplants. 34° 10.37' x 109° 58.80'. 6690 ft.

Continue N and NE on Porter Mountain road to about 11 miles from Lakeside near Sponseller Lake. Resident at nearby Guide Service gave directions to Sponseller Lake.

BF 98. jamesii. Arizona. Navajo County. Sitgreaves National Forest. About 11 miles NE of Lakeside on Porter Mountain Road near Sponseller Lake. No road to lakebed itself, must walk in (from S). Near site of Roberts 190 (1916) = Bamberg's database 415J. Open grassy meadow S of Sponseller Lake. 34° 13.51' x 109° 50.67'. 7013 ft. Very many plants in a patch ca. 200 ft diameter in moist black soil. Plants with thick stems, must have been quite large before being grazed. All plants yellowed, often with surprisingly abundant mature fruit (up to 7 per inflorescence), but tubers not mature. Dozens of Colorado potato beetles noted. Collected fruit.

Hiked to Sponseller (dry) lakebed. Found nothing in lakebed or among volcanic boulders on the S and E edges, nor under trees near lakebed.

BF 99. jamesii. Arizona. Navajo County. Sitgreaves National Forest. About 11 miles NE of Lakeside on Porter Mountain Road near Sponseller Lake. No road to lakebed itself, must walk in (from S). Near site of Roberts 190 (1916) = Bamberg's database 415J. Near S shore of Sponseller Lake near where the fence crosses the wash. In needle mulch under a few Junipers. Hundreds of plants to 1 ft tall, most smaller, green, but only a few transplantable. No flowers or berries, a few mature tubers. Collected plants and a few tubers. GPS 34° 13.95' x 109° 50.69'. 7000 ft.

BF 100. jamesii. Arizona. Navajo County. Sitgreaves National Forest. About 11 miles NE of Lakeside on Porter Mountain Road near Sponseller Lake. No road to lakebed itself, must walk in (from S). Near site of Roberts 190 (1916) = Bamberg's database 415J. Just S of fence in shady gambel oak thicket. Large (10") yellow plants with abundant, mature fruit. Only 500-1000 ft from BF 98. GPS 34° 13.70 x 109° 50.60. 7000 ft.

Return Lakeside and to PineTop for coffee. Continue S on 73 past Indian Pine to near site of Schmidt 219 (1963) = Bamberg's database 458J. To FR 69E to White river. Streamside habitat of Ponderosas, igneous boulders, moist alluvium all looked appropriate, but found nothing. Continue on 73 S and W to 60 and S to 12 and W to Cibique. Looked around stream at Cibique town. Road to Grasshopper ruins closed due to fire maintenance, so could not look at site of Bohrer 1494 (1971) = Bamberg's database 127J. Continue S on 60 to Globe to Lodge at El Rancho motel.

Monday, September 23rd

Breakfast at Jerry's in Globe. Then 77 S to Oracle. Toward Summerhaven on Mt. Lemmon road (gravel). Got to a few miles past Peppersauce when local on 4-wheeler stopped us to say that road to Mt. Lemmon was closed due to fire maintenance. Turned back toward Oracle. Got and changed flat tire. Back to Oracle and 77 to Tucson, replace ruined tire. Through city to NE corner of Tucson to Santa Catalina Hwy to Mt Lemmon Post Office. Could not look at site of Buhrow 146 (1979) = Bamberg's database 132F or Niering and Whittaker s.n. (1963) = Bamberg's database 376F because road closed due to fire maintenance. Noted Smith 14173 (1938) = Bamberg's database 468F has wrong coordinates-- Bear Wallow Campgrounds is 32° 25.44' x 110° 44.06'. McLaughlin 7006 (1996) = Bamberg's database 352F also has wrong coordinates. Not at Summerhaven but same site as SBV 1 =

32° 26.90' x 110° 45.32'. Looked here and found only a few green plants with immature berries on S side of road in moist, shaded ravine-- no collection. Insufficient time to look at other sites on Mt. Lemmon. Also, rains here have been less and more recent than in SE, so plants less abundant and mature than expected.

BF 101. fendleri. Arizona. Pima county. Near Tucson in Santa Catalina Mts. N on Santa Catalina Hwy toward Mt. Lemmon. At Palisades ranger station. Site of Bamberg 1. Under trees in grassy ravine just below horse corral on SW side of road. Off limits to public, but asked permission. Many robust green plants to 6", grazed, no flowers or fruits, collected ca. 12 transplants. 32° 24.62' x 110° 42.91'. 7920 ft.

Return to Tucson, Supper at El Indio restaurant and lodge at Motel 6.

Tuesday, September 24th

A day to wash clothes, check maps, bring log up to date, pick up colleagues Joe Pavsek and Chuck Brown at Tucson airport, drive to Sierra Vista for supper at "Po Folks" and lodge Motel 6.

Wednesday, September 25th

S on 90 and 92 to Ramsey Canyon Road. Got oriented with help of Lisa Naas, TNC, 520-378-4952, lnass@tnc.org. Explored all the way to the end of Ramsey canyon property (narrow rock-walled gorge) and returned to visitor center.

BFBP 102. fendleri. Arizona. Cochise county. Near Sierra Vista in Ramsey Canyon (owned by The Nature Conservancy). Site of many previous collections (e.g., SBV 3 (1992)). One plant beside road very close to visitor center. A small colony of yellow, 6" plants in grass under an apple tree just a few hundred feet from visitor center and directly N across the creek from the Ramsey Canyon bronze plaque. Collected a few tubers. Poor GPS reading, but near 31° 26.60' x 110° 18.83'. 6030 ft. Taken by Brown for *M. chitwoodi* nematode testing.

Return to 92 and S to road to Coronado National Memorial. To Bear Creek, FR 48B to Wakefield mine and SBV 2 (*jamesii*) site. But looked unfamiliar and found nothing. Very dry. Hiked 45 minutes, almost to Wakefield Mine (site of Hawkes 1217), but realized this could not be locale of SBV 2. Returned to main Montezuma Canyon road and E to next access to

mountains which is Ida Canyon road just SE of Sutherland Peak. This recognized as true location of SBV 2. One can see that this is much closer to base of mountains than Wakefield mine road.

BFBP 103. jamesii. Arizona. Cochise county. Near Sierra Vista. Off Montezuma Canyon road in Coronado National Memorial. Ida Canyon SE of Sutherland Peak. Along road to creek bed and W at fence line to shady ravine with oaks and sycamores. In moist thick layer of leaf mulch and among grass and rocks. Very many yellow plants, widespread, without flowers or fruit. Collected tubers. Re-collection of SBV 2 (1992) which was collected as plants. $31^{\circ} 22.84'$ x $110^{\circ} 19.76'$ 6000 ft.

Return to Sierra Vista to eat at Star's Buffet, replenish batteries at K-Mart and lodge Motel 6.

Thursday, September 26th

Lisa Naas at Ramsey canyon said that Miller Canyon road does not go to the crest trail between Miller and Carr peaks (as Topo II indicates), but that Carr Canyon road goes up the highest. Got maps from Ranger Station on 92. From 92 S of Sierra Vista take Carr Canyon road W, 5-6 miles of gravel road to 7400 ft.

BFBP 104. fendleri. Arizona. Cochise county. Near Sierra Vista. Off 92 up Carr Canyon road (FR 368) to Carr Peak trail (107). From about 8350 ft to top of Carr peak. Site of Goodding 264(1909) = Bamberg's database 209F. N facing slope and gulch shaded under poplars and brush in rich moist organic soil. Many yellow plants to 6" with occasional mature fruit. A single immature Colorado potato beetle noted here. $31^{\circ} 24.77'$ x $110^{\circ} 18.24'$. Higher along trail on E facing slope just below start of short trail 108 (to peak) and noted all the way to summit. Under big burned Ponderosas in grass and open areas among rocks in trail. Large plants, some quite bushy and green (but grazed), often with many mature fruit. $31^{\circ} 24.77'$ x $110^{\circ} 18.30'$. 9000 ft. Collected fruit, pooled all from Carr Peak area.

Return to Sierra Vista to eat at Star's Buffet. Then continuing from Fry road into Ft Huachuca and to Garden Canyon. Topo II does not show road to Garden Canyon clearly, but Forest Service map does. Location of Reeves R898 (1974) = Bamberg's database 407F is not same as Yatskievych 80-468

(1980) = Bamberg's database 586J, the former being in "a side canyon of Huachuca canyon" (to the NW, probably about $31^{\circ} 31.5' \times 110^{\circ} 23.0'$).

BFBP 105. *jamesii*. Arizona. Cochise county. Near Sierra Vista. Fry road to Ft Huachuca and SW to Garden Canyon. Site of Yatskievych 80-468 (1980) = Bamberg's database 586J. To picnic area at end of paved road. E facing rock ledges on S side of road directly across creek SW of big square cement water tank. At $31^{\circ} 28.45' \times 110^{\circ} 20.92'$ and 5400 ft. And farther W to directly across from picnic pavilion on S side of road under trees and brush in moist leaf mulch at $31^{\circ} 28.33' \times 110^{\circ} 21.11'$. And 75 paces S of first place creek crosses road SW of picnic pavilion, in creek bed among oaks, sycamores and brush in moist leaf mulch at $31^{\circ} 28.32' \times 110^{\circ} 21.19'$. In all these places many plants yellow to 12" without berries. Collected tubers.

BFBP 106. *fendleri*. Arizona. Cochise county. Near Sierra Vista. Fry road to Ft Huachuca and SW to Garden Canyon. Site of Yatskievych 80-468 (1980) = Bamberg's database 586J. To picnic area at end of paved road. At 75 paces S of first place creek crosses road SW of picnic pavilion, in creek bed among oaks, sycamores and brush in moist leaf mulch at $31^{\circ} 28.32' \times 110^{\circ} 21.19'$. 5400 ft. Only a few small yellow plants. Collected one tuber.

No time to conduct major hiking expeditions needed to explore Miller peak and other sites on crest like Lehto 1897 (1973), McLaughlin and Bowers 6080 (1990), Wentworth 1887 (1973) = Bamberg's database 316J, 354F, 539F respectively, or McLaughlin and Bowers 5922 (1990) = Bamberg's database 353J at Sunnyside canyon. Also, we now know that we have never visited the actual site of Wakefield mine, Hawkes 1217.

Drive E to Willcox on 10 to lodge at Super 8 motel.

Friday, September 27th

Take 186 S from Willcox to near entrance to Chiricahua National Monument, where gravel Pinery Canyon road goes to Pinery Campground, Rustler Park and Barfoot Park in Coronado National Forest. To Pinery Campground.

BFBP 107. *fendleri*. Arizona. Cochise county. Coronado National Forest. Chiricahua mountains. Pinery canyon road at Pinery

Campground, site of SBV 4 (1992). Along Pinery creek on both sides of road and under Ponderosas to the E side of campground. Small yellow and light green larger (to 8") plants, occasional fruit. Collected fruit. 31° 56.00' x 109° 16.27' and 7000 ft.

Continue to Barfoot Park.

BFBP 108. *fendleri*. Arizona. Cochise county. Coronado National Forest. Chiricahua mountains. Pinery canyon road to Barfoot Park. Approximate site of several previous collections, e.g., Blumer 1432 (1906) and for germplasm = Hawkes 1177 (1958), Ugent and Ruhde 14 (1978), SBV 5 (1992), BAM 23 (1995). Just before steep decent into Barfoot park camping / picnic area, very steep N facing slopes on both sides of road. Very many large green plants under Ponderosas and brush in leaf much and rich, black rocky soil. In some places the dominant vegetation. Often grazed unless very steep and protected by brush. Occasional fruit, just mature. Collected fruit. Bad GPS reading but Topo = 31° 55.08' x 109° 16.41' and 8400 ft.

Fruit collection from BBPF 108 was divided with Brown for *M. chitwoodi* nematode evaluation. Brown also sampled 5 or 6 additional sites around the camping area, spring, horse corral, etc., as tubers where plants were typically smaller, more scattered and yellow (mature), and took these samples home for nematode analysis. A few fruit were found at horse corral.

Continue to Rustler Park. Site of 14 previous collections. For germplasm = Hawkes 1180 (1958), SBV 6 (1992), BAM 22 (1995). Small yellowed plants on grassy NE facing slope SW of circle drive. Dry conditions and not found under Ponderosas in circle drive as in previous years. Brown collects some tubers for nematode tests. Did not see *jamesii* as reported by Van Devender and O'Rourke s.n. (1975) = Bamberg's database 511J. Jeep trail S from Rustler park too rough to drive.

No time to conduct extensive hiking to crest trails in Chiricahuas where 4 other *fendleri* sites have been reported and habitat could be appropriate at many other trailed locations to the S never reported to have potatoes, e.g., Chiricahua, Snowshed, Sentinel and Monte Vista peaks. Also, Rucker canyon road and trails accessed from SW side of Chiricahuas.

Return down mountain to Chiricahua National Monument. Stop at Faraway ranch area, site of 4 previous *jamesii* reports. Germplasm = BAM 24 (1995), SBV 34 (1992), Hawkes 1207 (1958). Looked briefly at site just N of Faraway parking lot in sand along creek. Very dry. Found nothing.

Proceed to parking lot below Sugarloaf mountain and 0.7 miles on trail to summit.

BFBP 109. *fendleri*. Arizona. Cochise county. Coronado National Forest. Chiricahua mountains. Chiricahua National Monument. Summit of Sugarloaf mountain. Site of Reeves R998 (1974) = Bamberg's database 409F. Only under the interpretive sign at the peak. Among grass in open, dry, rocky soil. Only about 10 small (4-6") yellow plants. No fruit or flowers. Collected one quite large (2 cm diameter) tuber. 32° 00.86' x 109° 19.52'. 7300 ft.

Return to parking lot and road to Massai point parking lot and trailhead. Took trail 0.3 miles N and then 0.7 mile S along Totem Canyon to juncture with E-W trail. Presumed site of Jandrey and Reeves R4241 (1975) = Bamberg's database 302F, but this site is about 200 ft lower than reported 6600 ft. Retrace N toward parking lot.

BFBP 110. *fendleri*. Arizona. Cochise county. Coronado National Forest. Chiricahua mountains. Chiricahua National Monument. Trail from Massai point parking lot to Totem canyon. About at midpoint of 0.7 mile N-S trail at about 6600 ft. Near site of Jandrey and Reeves R4241 (1975) = Bamberg's database 302F. Where trail takes a sharp bend, meets level of the creek bed and there is a small E facing canyon to W of trail. Under oak and pine shade among rocks in sandy soil. Only two small, yellow plants just off trail toward creek. Collected two small tubers (but immature so died). Approx. coordinates = 32° 00.40 x 109° 18.93 at 6600 ft.

No time to look at Dos Cabezas site Bingham 2473 (1976) = Bamberg's database 117F. No obvious access anyway.

Drive back to Wilcox. Wash car. Eat at Salsa Bar & Mexican restaurant. Drive to Tucson and drop Brown and Pavek at Super 8 Motel for their return flights the following morning. Bamberg and Fernandez continue to Eloy (about half way from Tucson to Phoenix) to lodge at Motel 6.

Saturday, September 28th

Breakfast at Iron Skillet buffet, find beer box in dumpster for transporting plants on airplane. Drive to Phoenix and return vehicle to Advantage and back to airport. Take 12:45 flight to Chicago and then Green Bay, drive home arriving about 10 PM.

Scars on fruit observed from several sites indicate fruit fly. To avoid larvae eating seeds, Brown recommended storage in refrigerator until seed extraction.

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EXECUTIVE SUMMARY

Background: Trip participants were John Bamberg and Charles Fernandez, NRSP-6, US Potato Genebank, Sturgeon Bay, WI; Joe Pavek, USDA, ARS, Aberdeen, ID (retired) and Chuck Brown, USDA, ARS, Prosser, WA. Pavek provided additional finesse in finding obscure plants from his experience during three previous expeditions. Brown's research interest in *in situ* population resulted from his discovery of the novel nematode resistance. Funding was provided by Karen Williams of the USDA, ARS Plant Exchange office, NGRL, Beltsville, MD. Thus BF = Bamberg and Fernandez, BFBP = Bamberg, Fernandez, Brown and Pavek. Collection numbers continue sequentially from previous domestic US Potato Genebank collections. Despite reports of severe drought, weather reports indicated about one inch of rain each week for the preceding six weeks.

Objectives were to 1) collect new potato germplasm from herb spec reported sites in NW corner of state above Grand Canyon, in Sierra Ancha wilderness and other sites around Gila county, and in Huachuca and Chiricahua mountains. 2) Make multiple collections from a single area (Mt. Lemmon) to see how representative point collections (often the necessity) may be. 3) Collect more samples at and near sites found to have novel resistance to a serious potato nematode, *M. chitwoodi*.

Results. *Trip was exceptionally successful.* Timing appeared to be ideal for many of the sites, as large plants with unusual abundance of fruit was found. Germplasm collections were made from 14 *new* sites, most relatively distant from any other existing genebank samples. Five re-collections were made. Several sites could not be accessed, and several more were not attempted due to a lack of time for extensive hiking. Available time and conditions were not sufficient to attempt looking in NW corner of state above Grand Canyon. Abundance of plants on Mt. Lemmon was not sufficient for taking multiple samples from a localized area for research. Samples for survey of novel nematode resistance were successfully taken, with particular emphasis on locations in and near the Huachuca and Chiricahua mountains.